

### REMARKS

Applicant submits that the rejection of claims 1-52, 88-108 and 117-130 as obvious under 35 U.S.C. § 103(a) over Marino et al. in view of Sargent is improper based on the facts and law, particularly because the Office has failed to establish all the elements of a *prima facie* case of obviousness.

In order to establish a *prima facie* case of obviousness based on a teaching, suggestion, or motivation in the prior art to modify the prior art reference to arrive at the claimed invention, the Office must establish (1) that there was some teaching, suggestion, or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings, (2) that there was a reasonable expectation of success, and (3) whatever additional findings based on the *Graham* factual inquiries may be necessary, in view of the facts of the case under consideration, to explain a conclusion of obviousness. Applicant submits that the Office has failed to establish a *prima facie* case of obviousness because, contrary to the assertion of the Office, Marino et al. do not motivate one skilled in the art to replace their  $\gamma\text{-Al}_2\text{O}_3$  supporting structure with the Raney nickel supporting structure of Sargent and because the Office has not established a reasonable expectation of success in making the substitution, i.e., that the resulting catalyst would exhibit improved activity and stability.

#### **The Office's Articulation of Motivation based on the Disclosure of Marino et al. is Misplaced**

The only reason set forth by the Office as to why one skilled in the art would replace the  $\gamma\text{-Al}_2\text{O}_3$  supporting structure of Marino et al. with the Raney nickel supporting structure of Sargent is the Office's suggestion on page 5 of the Office

action that it would be desirable to use the copper plated nickel sponge of Sargent as the catalyst in the reaction of Marino et al. since Marino et al. teach that the presence of nickel improves the performance of the catalyst. The Office has failed to respond to applicant's argument set forth in the paragraph bridging pages 5 and 6 of his response dated October 11, 2007 that the disclosure of Marino et al. merely suggests to the skilled artisan to incorporate nickel in a ceramic-supported copper catalyst by depositing nickel onto the **surface** of the catalyst. The Office has not established how Marino et al. (or how any other reference or the common knowledge of the skilled artisan) motivate the skilled artisan to replace their supporting structure with a Raney nickel supporting structure.

The Office's reasoning on page 7 of the Office action that one skilled in the art **could** be inspired to experiment with a nickel support especially in view of Sargent's reference to use of his support in certain dehydrogenation reactions is not convincing. If the Office is the opinion that it is "obvious to try" a nickel support, applicant requests that the Office set forth the entire *prima facie* for an obvious to try rationale as set forth in MPEP § 2143(E) including a finding that use of a nickel support is one of a finite number of identified, predictable potential solutions to the recognized need or problem. Regarding, Sargent's reference to use of his support in "**certain**" dehydrogenation reactions, applicant notes that the claimed process is not directed to dehydrogenation reactions in general, but rather to processes for gas-phase reforming of an alcohol as recited in independent claims 1 and 117 and processes for reforming ethanol as recited in independent claim 27.

The Office's reasoning on page 8 of the Office action that one skilled in the art would recognize that the catalyst of

Sargent is suitable for gas-phase reactions is misplaced. Newly cited references U.S. Patent No. 3,960,898 to Hodge and "Safety Data for tert-butyl alcohol" do not provide any evidence that one skilled in the art would recognize that the catalyst of Sargent could be used for gas-phase dehydrogenation. Hodge does not teach dehydrogenation of tertiary butyl alcohol as asserted by the Office. Hodge teaches dehydrogenation of a low-melting diastereoisomer of zearalanol in a reaction solution of t-butyl alcohol and Raney nickel (See col. 2, lines 41-48; Example 1; and claim 12 from which claim 15 depends). There is no teaching or suggestion that the dehydrogenation of the low-melting diastereoisomer of zearalanol is carried out in the gas-phase. Applicant invites the Office to establish why the common knowledge of the skilled artisan, the disclosure of Sargent itself or any other prior art reference would motivate one skilled in the art to utilize the catalyst of Sargent in the gas-phase reforming of an alcohol.

Regarding applicant's evidence of unexpected results, the Office argues that applicant must compare their results to the combination of the disclosures of Marino et al. and Sargent. This requirement is clearly contraindicated by established law and the examination guidelines:

Although evidence of unexpected results must compare the claimed invention with the closest prior art, **applicant is not required to compare the claimed invention with subject matter that does not exist in the prior art.** *In re Geiger*, 815 F.2d 686, 689, 2 USPQ2d 1276, 1279 (Fed. Cir. 1987) (Newman, J., concurring) (Evidence rebutted *prima facie* case by comparing claimed invention with the most relevant prior art. Note that the majority held the Office failed to establish a *prima facie* case of obviousness.); *In re Chapman*, 357 F.2d 418, 148 USPQ 711 (CCPA 1966) (**Requiring applicant to compare**

**claimed invention with polymer suggested by the combination of references relied upon in the rejection of the claimed invention under 35 U.S.C. 103 "would be requiring comparison of the results of the invention with the results of the invention." 357 F.2d at 422, 148 USPQ at 714.)). MPEP § 716.02(e).**

Clearly, it not beneficial in determining obviousness to compare the stability and activity of the catalyst utilized in the claimed processes for reforming of ethanol with the stability and activity of a hypothetical catalyst with the same structure. The Office's position is clearly in error. Applicant is entitled to have the unexpected results of his invention considered by the Office.

**The Office has not Established a Reasonable Expectation of Success**

The Office has failed to establish that there was a reasonable expectation of success in replacing the  $\gamma$ -Al<sub>2</sub>O<sub>3</sub> supporting structure of Marino et al. with the Raney nickel supporting structure of Sargent. Applicant has provided substantial reasons why those skilled in the art appreciate the unpredictability in the development of catalytic reaction systems (See the paragraph bridging pages 6-7 of applicant's response dated October 11, 2007). The Office must establish a reasonable expectation of success to establish a *prima facie* case of obviousness.

Applicant submits that the Office has failed to establish a *prima facie* case of obviousness because the assertion that Marino et al. motivate one skilled in the art to replace their  $\gamma$ -Al<sub>2</sub>O<sub>3</sub> supporting structure with the Raney nickel supporting structure of Sargent is misplaced, because the Office has failed to consider applicant's unexpected results and because the Office has not established a reasonable expectation of success


in making the substitution. For at least these reasons,  
applicant respectfully requests allowance of all pending claims.

**Request for Interview**

After considering the above remarks, should the Examiner decide to maintain any of the rejections set forth in the Office action dated January 4, 2008, applicant respectfully request an interview with the Examiner prior to issuance of the next action on the merits.

The Commissioner is hereby authorized to charge any government fees which may be required including the fee for the Request for Continued Examination submitted herewith to Deposit Account No. 19-1345.

Respectfully submitted,

A handwritten signature in black ink that reads "Michael J. Vander Molen". The signature is written in a cursive, flowing style.

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